

News

Creating Comets

Next month, if all goes as planned, the "world's first artificial comet" will be created when a satellite stationed 110,000 km deep in space, just outside the earth's magnetosphere, releases a cloud of barium ions. The phenomenon—a bluish-white, 600-km long "cloud" that should be visible to the naked eye for about 10 minutes—will provide scientists with some clues about how the solar wind affects comet tails. The experiment is one of several in a three-station, three-satellite study of the solar wind, comets, and the magnetosphere.

The "artificial comet" experiment will be the second of three sets of scheduled ion releases as part of the Active Magnetospheric Particle Tracer Explorers (AMPTE) project, a study involving scientists from the Federal Republic of Germany, the United Kingdom, and the United States. Two lithium releases have taken place to date. The scientists hope to trace the solar wind's path by using these ion discharges.

Lithium and barium were chosen for two reasons: The solar wind contains very small concentrations of these substances, and both are easily ionized. Ions, or charged particles, are sensitive to the electromagnetic forces found in space. Ionized barium and lithium atoms released outside the magnetosphere should serve as a "dye" and allow scientists to trace the solar wind's path as it encounters and enters the magnetosphere.

The lithium vapor clouds, which ionize more slowly than barium, will not be visible to the naked eye. However, scientists expect the lithium cloud to expand over an area of 8,000–16,000 km, which will allow them to "map" a large area of the magnetosphere.

Scientists at the Applied Physics Laboratory (APL) of Johns Hopkins University are currently analyzing data gathered from the first two lithium releases. Initial results indicate that lithium was selected inside the magnetosphere by a satellite stationed there but has not yet been conclusively traced to the satellite discharge outside the magnetosphere.

The three satellites used in AMPTE were launched in a stack aboard a Delta rocket from Cape Canaveral on August 16, 1984. The Federal Republic of Germany's 705-kg Ion Release Module (IRM), from which the lithium was discharged, is stationed outside the magnetosphere. The lithium and barium are held in 16 injectable aluminum canisters strapped to the outside of the satellite. Instruments to monitor local conditions around the IRM are also being carried, which will help the scientists select the optimum time for the ion releases.

The U.S. satellite, the 242-kg Charge Composition Explorer (CCE), designed and built by APL, is looking for the presence of the lithium "tracer" ions after they enter the magnetosphere. The United Kingdom Subsatellite (UKS), a maneuverable 77-kg spacecraft, is situated within a few hundred kilometers from the IRM and is designed to measure magnetic fields, plasma waves, electrons, and ions. Several U.S. ground observatories will also monitor the experiments, as will aircraft flying over North and South Pacific oceans.

NASA says the AMPTE project may very well have some short-term practical applications. In addition to purely scientific discoveries, data obtained may shed some light on how to protect the delicate electronic circuits carried aboard satellites and manmade spacecraft from the solar wind, a stream of hot, ionized gas travelling at a speed of about 1.6×10^6 km/h. Spacecraft electronic component failures attributed to the solar wind have been fairly common in the past; exactly how the instruments are damaged is not clear. Results from the AMPTE mission may provide some clues to help engineers "harden" spacecraft components against such failures.

New Solar System

Using sensitive optical instruments and computer enhancement techniques, two astronomers believe that they may have "photographed" what could be a new solar system forming around Beta Pictoris, a star 50 light-years from earth. Using a 254-cm telescope at the Las Campanas Observatory in Chile, combined with a charged-coupled device (CCD) and a coronagraph, an optical instrument developed for detecting very faint objects close to brighter ones, the astronomers photographed clearly for the first time a large disk surrounding the star. This disk may be evidence of a new solar system.

The scientist, Bradford A. Smith of the University of Arizona, Tucson, and Richard J. Terrile of the Jet Propulsion Laboratory (JPL), Pasadena, Calif., say that there is some evidence that planets could have formed around the star. The brightness of the star seen through its disk indicates that the numerous particles of the disk may have been swept away; the formation of planets would produce this effect. However, the astronomers have not yet been able to determine if there are actually planets around the star.

The circumstellar disk, believed to be no more than a few hundred million years old because it is relatively flat, appears nearly edge-on viewed from the earth and extends more than 64×10^6 km, or more than 400 times the distance from the earth to the sun.

The disk is believed to be made up of particles ranging in size from tiny grains less than ten microns in diameter to the size of the nuclei of comets a few kilometers across. Scientists believe the composition includes ice, silicates and carbonaceous compounds, the same materials from which the earth and other planets of the solar system are believed to have formed.

GRL Editors: 1986–1988

The leading rapid publication journal in the geophysical sciences is seeking candidates to succeed James C. G. Walker, whose term as editor-in-chief ends December 1985. AGU also seeks candidates to succeed the five regional editors: Rob Van der Voo, North America; Gaston J. Kockx and William Lowrie, Europe; Tetsuya Sato, Asia; and Kurt Lambeck, Australia.

AGU President Charles L. Drake has appointed a committee to recommend candidates for the 1986–1988 term. Resumes of those interested in serving in these influential and prestigious posts or letters of recommendation from those who wish to suggest candidates should be sent by February 15, 1986, to GRL Editor Search Committee, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009.

PASSCAL Science Planning

The Program for Array Seismic Studies of the Continental Lithosphere (PASSCAL) is one of two major scientific initiatives organized this year under Incorporated Research Institutions for Seismology (IRIS). PASSCAL is a cooperative program open to the whole earth science community. Participation is through PASSCAL committees, which are open to all interested scientists.

The Science Planning and Coordination Committee of PASSCAL will hold an experiment planning meeting at the AGU Fall Meeting in San Francisco. The meeting will be held Tuesday, December 4, 8–5 P.M. in Room 327 of the Convention Center. All interested earth scientists are encouraged to participate in this meeting and to help develop plans for cooperative experiments for studying the continental lithosphere. Experiments that can be realized with existing instrumentation, as well as with the PASSCAL instruments currently under development, are encouraged. Topics to be discussed at the meeting include review of science planning and coordination activities of PASSCAL, review of ongoing lithospheric seismology experiments, discussion of proposed experiments, and general discussion of science planning activities.

During the past years, several new cooperative programs to study specific geologic problems have been launched. These activities include both multiyear multidisciplinary studies and single-purpose experiments. Status reports will be presented at the planning meeting on several of these efforts, including the Trans-Alaskan Lithospheric Investigation (TALI), the Appalachian Drill Site characterization study, the Southern Oklahoma Aulacogen wide-angle experiment, and the Long Valley, California, Magna Chamber Study. Presentations from other groups currently conducting lithospheric seismology experiments or individuals interested in proposing new cooperative experiments are also strongly encouraged.

These experiments will be important not only for their scientific results but will also serve as prototype experiments for PASSCAL and will provide experience in design and operation of array seismic experiments and developments in data management, processing, and interpretation capabilities. Although a number of lithospheric seismology projects are presently in progress, as described above, it is anticipated that new large-scale array seismic experiments can be successfully completed in the next 2–3 years and will serve as benchmark experiments for the PASSCAL effort. Instruments presently available for lithospheric studies include the 120 component seismic refraction system of the U.S. Geological Survey, portable digital seismographs available from industry on a lease basis, large-spread reflection profiling equipment, and a limited number of digital seismographs from universities and national laboratories.

Investigators are also encouraged to develop smaller-scale research efforts related to improvements in seismic array studies technology necessary for future implementation in PASSCAL experiments. Such efforts could include studies of effective use of array recording, efficiency of controlled sources, capability for seismograph triggering for natural sources, improved data management procedures, techniques to improve signal-to-noise ratio in array recording, and development of new data processing and interpretation procedures for lithospheric array studies.

We request that persons wishing to present discussions of proposed new seismic experiments please contact Bill Ellsworth, *Co-chair of the Science Planning and Coordination Committee of PASSCAL*.

This news item was contributed by Bill Ellsworth and Larry Braille, *Co-chairs of the Science Planning and Coordination Committee of PASSCAL*.

Friends of Science

Ten members of Congress have been presented with the Friends of Science Award by the National Coalition for Science and Technology (NCST). The awards, honoring significant contributions to science, engineering, and science education, are made every 2 years at the end of the congressional session.

The recipients this year are Sen. Pete V. Domenici (R-N.M.), Rep. Joseph D. Early (D-Mass.), Rep. Bill Frenzel (R-Minn.), Rep. Albert Gore, Jr. (D-Tenn.), Rep. Judd Gregg (R-N.H.), Sen. Daniel K. Inouye (D-Hawaii), Rep. Stan Lundine (D-N.Y.), Sen. Sam Nunn (D-Ga.), Rep. Henry Waxman (D-Calif.), and Rep. Ed Zschau (R-Calif.).

Except for Sen. Inouye, whose term expires in 1988, all of this year's recipients were up for reelection in the national elections held November 6. All were successful in securing another term in Congress. In addition, Albert Gore was successful in his bid for a Senate seat, filling the vacancy left by the retiring Senate Majority Leader Howard H. Baker (R-Tenn.).

Individual flows of the nation's five largest rivers for September were as follows. While the average flow of each of the "Big Five" rivers declined seasonally from August, flows of four of the large streams were above average for the month. The Mississippi River at Vicksburg, Miss., with an average flow of 176 bpd, was 5% below long-term average; the St. Lawrence River near Massena, N.Y., at 193 bpd, was 15% above average; the Ohio River at Louisville, Ky., 19 bpd, was 27% greater than the long-term average; the Missouri River near Hermann, Mo., at 43 bpd, was 24% above average; and the Columbia River at The Dalles, Ore., at 65 bpd, was 5% greater than the long-term average.

JGR-Space Physics Editors: 1986–1989

AGU is seeking candidates to succeed Bengt U. O. Sonnerup as *JGR-Space Physics* editor. His term as editor ends December 1985.

The successful candidate will handle original contributions on aeronomy, magnetospheric physics, planetary atmospheres, and heliospheric physics.

AGU President Charles L. Drake has appointed a committee to recommend candidates for the 1986–1989 term. Resumes of those interested in serving in this critical AGU position or letters of recommendation from those who wish to suggest candidates for it should be sent by February 15, 1985, to *JGR-Space Physics Editor Search Committee, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009*.



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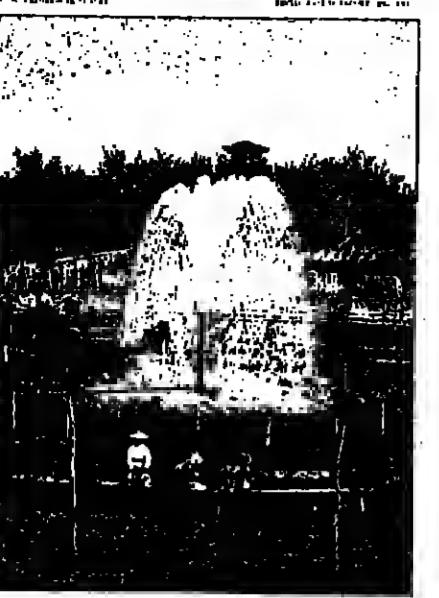
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WaterWatch



WaterWatch
News of the Hydrology Section

Editor: Mary P. Anderson, Department of Geography and Geophysics, University of Wisconsin-Madison, Madison, WI 53706 (608-262-2396).

Information Report

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This information report was contributed by Edward Hoehn, Swiss Federal Institute for Water Research, Wettzell.

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toxic and mobile contaminants from waste-disposal sites, agricultural pesticides and fertilizers, and sewage effluents. Much of the hydrogeological research in these countries is therefore devoted to what has become known in English as contaminant hydrogeology. Unlike the hydrogeologists of the New World, European hydrogeologists do not meet regularly as a group, and relatively few results from German-speaking researchers are published in English. Consequently, it is more difficult to know what researchers are doing in Europe than it is in North America. Much of the work of German-speaking hydrogeologists was published in "Quality of Groundwater" (the proceedings of the Noordwijkerhout conference, herein referenced as *Stud. Environ. Sci.*, 17, 1984).

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Simulation Studies

Groundwater quality management models have been applied in the German Democratic Republic (Lückner and Nitsche, *Stud. Environ. Sci.*, 17, 1983-1971, 1981; Diersch, *Angew. Math. Mech.*, 63, 479-488, 1983) to problems of regional groundwater contamination related to the use of nitrates (Zwirner, *Stud. Environ. Sci.*, 7, 1115-1120, 1981) and to the open cast mining for lignite (Kallen, *Rep. 83-22, Int. Inst. for Appl. Systems Analysis, Linz*, 1982, 1983).

This international center will also constitute a technical support point for the United Cities Water Agency (Agence de l'Eau des Cities Unies), which has just been created in Nancy. This agency is a branch of the World Federation of Twinned Cities, designed to form an information link between the member cities.

International Commission on Groundwater

Commission on Groundwater

on Groundwater

on Groundwater

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Water Watch (cont. from p. 1179)

partment of Civil Engineering, University of Michigan, Ann Arbor, MI 48109. Further information can be obtained by calling Theis at 219-239-6247 or 315-268-7701, or Abriola at 319-763-9664.

History of Hydrology

The AGU History and Heritage of Hydrology Committee is sponsoring its first symposium, "History of Hydrology: Earth Science Aspects," at the 1984 Fall Meeting in San Francisco. Ten papers, spanning a range of interests, will be presented. The committee plans a second such session, also following a general topics format, for the 1985 Spring Meeting (May 27-31, 1985) in Baltimore, Md. Abstracts for this session should be submitted to the session organized by mid-February 1985. Persons interested in presenting a paper at this session are encouraged to contact the organizer, Simon Ince, Department of Hydrology and Water Resources, University of Arizona, Tucson, AZ 85721 (telephone: 602-621-5424).

Regional Water Balance Models

A special session entitled "Analysis of Error in Regional Water Balance Models" is planned for the AGU Spring Meeting. This symposium is sponsored by the Surface Runoff Committee and will be held in Baltimore, Md., during the week of May 27-31, 1985.

Water balance models have been utilized for decades by agricultural scientists, climatologists, hydrologists, etc., for a wide range of purposes at various spatial and temporal scales. This symposium addresses regional water balance models applied over regions in excess of, say, 50 km² and the much-neglected subject of analysis of errors in these models. Papers are solicited on this topic and may include but are not limited to studies of physical significance of state variables, parameter identification, effects of alternative networks of climatological variables, effects of different temporal resolution of precipitation data, errors associated with different methods of estimating areal evapotranspiration over large regions, accounting for seasonality, effects of spatial variations of parameters, and importance of and mechanisms for dealing with frozen ground and snow melt.

Conference proceedings will be published. Topics for papers include deterministic methods, statistical methods, and joint deterministic and statistical methods.

Abstracts for the meeting are due by April 10, 1984, and a full-length paper must be received by June 1, 1985. Inquiries should be directed to Hydrology and Water Resources Program, Engineering Research Center, Colorado State University, Fort Collins, CO 80523.

Papers may address traditional applications in hydrology, such as streamflow record reconstruction or groundwater recharge estimation, as well as other applications, such as development of drought indices or National Water Assessment-type activities. All applications, however, should be addressed with an emphasis on error propagation in the water balance models.

Anyone interested in contributing a paper should submit an abstract in AGU format by February 1, 1985, to William M. Alley, U.S. Geological Survey, 410 National Center, Reston, VA 22092 (telephone: 703-860-6927).

Karst Water Resources is Subject of Symposium in Turkey

An International Symposium on Karst Water Resources is scheduled for July 7-19, 1985, in Ankara and Antalya, Turkey. The symposium will be sponsored by the Karst Water Resources Research Center Project of Hacettepe University, the United Nations Development Program, the United Nations Technical Cooperation Department, and the Turkish State Hydraulic Works (DSI). Cooperators will be the Turkish National Committee for the International Hydrological Program, the International Association of Hydrological Sciences, the International Association of Hydrogeologists, and other international technical societies and United Nations organizations. Activities will take place in Ankara, Antalya, and locations in between. The first week of the symposium will be

coordinated with technical papers presented orally or by poster format. Papers may be presented in Turkish or English, with simultaneous translation. Field trips to points of interest around Antalya and between there and Ankara are planned for the second week of the symposium.

The technical program is expected to provide broad coverage of topics related to water resources in karst areas. Subjects that may be considered for the symposium include hydrogeology, geochemistry, modeling, laboratory testing, tracer techniques, geophysics and other exploration methods, land subsidence and sinkhole formation, remote sensing techniques, groundwater, and surface water hydrodynamics and interpretation, engineering properties and problems, water supply estimation, and irrigation potential and irrigation practice, among other potential subjects.

Notice of intent to offer a paper and/or to attend the symposium should be sent to A. Ivan Johnson, Water Resources Consultant, Woodward-Clyde Consultants, 7600 East Orchard Rd., Harlequin Plaza North, Englewood, CO 80111 or to Gulekic Gunay, Hydrogeological Engineering Department, Hacettepe University, Engineering Faculty, Beytepe, Ankara, Turkey. Details concerning the symposium arrangements and instructions on preparation of abstracts will be sent to those who indicate interest in the symposium.

Multivariate Analysis of Hydrologic Processes

A meeting on Multivariate Analysis of Hydrologic Processes will be held at Colorado State University, Fort Collins, Colo., on July 15-17, 1985. Sponsors will be the American Society of Civil Engineers, Colorado Section; the Hydrology Section of AGU; the International Association for Hydraulic Research (IAHR) Section on Methods for Water Resources Management; the IAHR Section on Stochastic Methods in Hydraulics; the International Association of Hydrological Sciences; and the International Water Resources Association.

Conference proceedings will be published. Topics for papers include deterministic methods, statistical methods, and joint deterministic and statistical methods.

Abstracts for the meeting are due by April 10, 1984, and a full-length paper must be received by June 1, 1985. Inquiries should be directed to Hydrology and Water Resources Program, Engineering Research Center, Colorado State University, Fort Collins, CO 80523.

Hydrologic Applications of Space Technology

The International Association of Hydrological Sciences (IAHS) and the World Meteorological Organization (WMO) are convening an International Workshop on Hydrologic Applications of Space Technology: Input to Hydrologic Models and Geographic Information Systems, to be held in Cocoa Beach, Florida, August 18-24, 1985. The workshop program will emphasize offered and invited oral or poster papers related to the input of remote sensing and remote data transmission to hydrologic models and geographic information systems.

Organizations interested in exhibiting equipment, systems, or publications or in demonstrating equipment or software programs should contact A. Ivan Johnson, president, IAHS International Committee on Remote Sensing and Data Transmission, 7471 Upham Court, Arvada, CO 80003. Persons wishing to offer an oral or poster paper for consideration by the program committee should submit a typed, single-spaced original and one copy of a 400-600 word abstract, in English, to Johnson at the above address or in the Secretary General, World Meteorological Organization, Case Postale no. 5, CH-1211 Geneva 20, Switzerland. Abstracts should be received by November 30, 1984.

Ivan Johnson, Woodward-Clyde Consultants, will be the local contact for the symposium. The symposium is scheduled for July 7-19, 1985, in Ankara and Antalya, Turkey. The symposium will be sponsored by the Karst Water Resources Research Center Project of Hacettepe University, the United Nations Development Program, the United Nations Technical Cooperation Department, and the Turkish State Hydraulic Works (DSI). Cooperators will be the Turkish National Committee for the International Hydrological Program, the International Association of Hydrological Sciences, the International Association of Hydrogeologists, and other international technical societies and United Nations organizations. Activities will take place in Ankara, Antalya, and locations in between.

The first week of the symposium will be

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Groundwater Contamination Studies

The American Society for Testing and Materials (ASTM) seeks papers for the Symposium on Field Methods for Groundwater Contamination Studies and Their Standardization, sponsored by ASTM Committees D-19 on Water and D-18 on Soil and Rock. The symposium will be held the week of February 2, 1986, in Cocoa Beach, Florida. The major topics areas include geophysical methods applied to groundwater studies, including borehole geophysics and in situ parameters and other exploration methods, land subsidence and sinkhole formation, remote sensing techniques, groundwater, and surface water hydrodynamics and interpretation, engineering properties and problems, water supply estimation, and irrigation potential and irrigation practice, among other potential subjects.

The technical program is expected to provide broad coverage of topics related to water resources in karst areas. Subjects that may be considered for the symposium include hydrogeology, geochemistry, modeling, laboratory testing, tracer techniques, geophysics and other exploration methods, land subsidence and sinkhole formation, remote sensing techniques, groundwater, and surface water hydrodynamics and interpretation, engineering properties and problems, water supply estimation, and irrigation potential and irrigation practice, among other potential subjects.

The symposium was preceded by the International Conference on Geomechanics on June 20-24, 1984. This conference was sponsored by the Industrial Fabrics Association International (IAFI) in cooperation with ASTM and 11 other organizations, including the American Society of Civil Engineers, the American Society of Agricultural Engineers, and the Environmental Protection Agency (EPA). Authors at 12 technical sessions discussed the use of geotextiles—rubber, plastic, and other types of flexible synthetic sheeting—as related to such topics as pond liners, floating covers, dams and embankments, pollution control applications, durability, seepage and leakage monitoring, water storage, and more. A trade show with exhibits from 45 manufacturers also was held on June 21 and 22. Two interesting tours visited the Bureau of Reclamation Engineering Center Laboratories in Denver and the Mount Elbert Reservoir, one of the largest geotextile impoundments in the world.

The 96 papers presented during the conference were prepared by IAFI and are available in two volumes for \$49 plus postage and handling charges. To order the symposium proceedings (ASTM STP), contact ASTM, Publications Division, 1916 Race Street, Philadelphia, PA 19103. For the two-volume conference proceedings, contact Industrial Fabrics Association International, 1916 Race St., Philadelphia, PA 19103 (telephone: 215-299-5141). Additional information on the symposium and instructions for submission of abstracts are available from both Collins and Greene or from Symposium Vice Chairman A. Ivan Johnson, 7474 Upland Court, Arvada, CO 80003 (telephone: 303-425-5610).

Land Subsidence International Symposium Held in Venice

The Third International Symposium on Land Subsidence was held March 18-25, 1984, in Venice, Italy. Sponsors were the Ground-Water Commission of the International Association of Hydrological Sciences (IAHS), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the Italian National Research Council (CNR), the Italian National Research Council (CNR), the Italian Regions of Veneto and Emilia-Romagna, the Italian Municipalities of Venice, Ravenna, and Monfona, the Venice Province, and the European Research Office. Sponsors included the International Association of Hydrogeologists (IAH), the International Society for Soil Mechanics and Foundation Engineering (ISSME), and the Association of Geoscientists for International Development (AGID).

Organized within the framework of UNESCO's International Hydrological Program, the symposium brought together over 200 international interdisciplinary specialists in the problems of land subsidence due to fluid and mineral withdrawal. Because man's conditioning heavy development of groundwater, gas, oil, and minerals is changing the natural regime and thus causing more and more subsiding areas in the world, there had been sufficient new land subsidence occurrence, problems, research, and remedial measures since the 1970 Second International Symposium held in Anaheim, California, to develop a most interesting program of nearly 100 papers from about 30 countries. The program emphasized the interaction of the environmental system of soil and rock confinement, impermeable barriers, and enclosed liquids. The theory, testing, and design considerations of such interactive systems was explored in relation to slurry walls and clay and mud earth artificial linings as applied to geotechnical engineering projects such as tailings and waste containment ponds, landfills, soil and biomass ponds, ditches, canals, and reservoirs. A number of papers presented research results on the interaction of various chemical and hazardous wastes with the soil and rock materials and lining or slurry materials.

The morning session of the symposium had eight papers addressing slurry walls, while the afternoon session had 10 papers concentrating on clay and soil admixtures. Eight papers were presented as posters during the coffee breaks and lunch period. Symposium papers will be published as an ASTM Special Technical Publication, available later in 1984.

Venice was an appropriate location for the symposium because of the serious subsidence problems there. An interesting 1-day boat trip to local subsidence sites in the Lagoon of Venice was held during the week, in addition to a 2-day field trip on March 24 and 25 in the areas around Venice, the Po River Delta, Ravenna, and Modena.

General cochairmen for the symposium were Lucio Ubertini, Institute Ricerche Idrologica, Pergola, Italy, and A. Ivan Johnson, Consulting Engineers, Arvada, Colorado. Johnson was also Program Chairman, and chairperson for local arrangements was Laura Carbone, CNR, Venice.

Persons wishing more details about the symposium should contact A. Ivan Johnson, Consulting Engineers, 7474 Upland Court, Arvada, CO 80003 (telephone: 303-425-5610). Papers will be available in a proceedings volume in early fall. The cost of the approximately 700-page volume (IAHS Publication 151) is \$35. The publication may be ordered from H. C. Riggs, IAHS Treasurer, 2000 Florida Avenue, N.W., Washington, DC 20008. Copies of the field trip guidebooks may be requested from Laura Carbone, IAH/UNESCO, 1984 San Polo, 00126 Venice, Italy.

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POSITIONS AVAILABLE

Faculty Position in Applied Geophysics or Structural Geology. The Department of Earth Sciences at the University of New Orleans, invites applications for a tenure-track position commencing August, 1985 in APPLIED GEOPHYSICS or STRUCTURAL GEOLOGY.

The University of New Orleans, located on the south shore of Lake Pontchartrain has 14,000 undergraduate and 2,500 graduate students. The Earth Sciences Department currently has a staff of 11 full-time, four part-time faculty and approximately 150 undergraduate geology majors and 50 master's students.

The appointment will be considered by the Department of Geology and Geophysics.

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Organic Chemical Oceanographer. The College of Marine Studies invites applications for a tenure-track position in chemical oceanography. Applicants should have a background in organic chemical oceanography, experience in analysis of specific organic compounds, and field experience. Interest or expertise in estuarine and coastal research is preferred. The successful applicant will have the opportunity to develop independent and cooperative research within existing interdisciplinary marine and coastal research programs. Facilities available include a modern research campus in Lewes, Delaware, a 120-ft-had research vessel, R/V Cape Henlopen. Teaching at the graduate level will be required, and the successful candidate will be expected to develop a funded research program and advise MS and PhD students. It is anticipated that the appointment will be at the Assistant Professor level, but applications from more senior persons are welcome. Applicants should send curriculum vitae, permanent address, and the names of three references to Peter H. Hedges, Chairman, Department of Geology and Geophysics, University of Delaware, Newark, DE 19716.

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Settlemeyer/Ohio State University. The Department of Geology and Mineralogy, The Ohio State University, is seeking an individual for a tenure-track position in structural geology and tectonics. The individual will be expected to carry out an active research program in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology. The position will be at the assistant professor level. Applications are encouraged from individuals with experience in structural geology and tectonics. The successful candidate will be expected to develop a research program in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. The position will be at the assistant professor level. Applications are invited from individuals with experience in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. The successful candidate will be expected to develop a research program in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. The position will be at the assistant professor level. Applications are invited from individuals with experience in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. The successful candidate will be expected to develop a research program in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. The position will be at the assistant professor level. Applications are invited from individuals with experience in structural geology and tectonics and to teach introductory and advanced courses in the field of structural geology and tectonics. 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Sedimentologist/Oceanographer/Texas A&M University. Applications are invited for a tenure track faculty position in the general field of marine sedimentology. The position will involve graduate level teaching and supervision of graduate and research students. Successful applicants will have demonstrated excellence in or a strong potential for independent research in the field of marine sedimentology. The position is available beginning September 1, 1985. Salary and rank will be commensurate with experience and qualifications. Applicants are invited to submit curriculum vitae, copies of publications, names of three persons whom may serve as references, and letter of interest by December 31, 1984, to Robert O. Reid, Distinguished Professor and Head, Department of Oceanography, Texas A&M University, College Station, Texas 77843.

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Texas Tech University/Geophysicist or Geologist/Sedimentologist. The Department of Geosciences at Texas Tech University seeks applications for a tenure track position in the fields of geophysics or elastic sedimentology to begin August 1985. Rank and salary will be commensurate with qualifications. The Ph.D. is required. Entry-level applicants would be considered. Applications should be submitted to the Chair, Department of Geosciences, Texas Tech University, P.O. Box 4109, Lubbock, TX 79409. Texas Tech is an equal opportunity/affirmative action employee. Applications deadline: January 31, 1985.

University of Wyoming/Department of Geology and Geophysics. The Department of Geology and Geophysics encourages applications from students interested in pursuing graduate research in the fields of igneous and metamorphic petrology and geochemistry. Current research topics involving field and laboratory studies include: island and continental volcanism, petrogenesis of granitic and ultramafic rocks, igneous and metamorphic petrology of ultramafic rocks, and geotectonics and geodynamics applied to the evolution of magmatic terranes. Facilities include an analytical geochemical lab for whole-rock and trace element analysis, a fully automated CAMECA isotope ratio mass spectrometer, a high pressure, high temperature, multi-anvil apparatus, a microthermometer lab, and an experimental petrology lab. Applications should contact:

Professor/Geochemistry Program
PO Box 3006, University Station
University of Wyoming
Laramie, WY 82071.

Department of Commerce is an equal opportunity employer. U.S. citizenship required.

Sedimentologist/Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). The National Ocean Service, Office of Glaciology and Geodetic Services announces a vacancy for the position of Geodesist GS-12/13. The position is in the Satellite and Ocean Dynamics Section of the Geodetic and Satellite Division, NOAA, Maryland. This research position will involve analysis of satellite altimeter data for application to ocean dynamics and geodynamics. Applicants should have a detailed knowledge of altimetry, marine geodesy, and physical oceanography, including concepts of geostrophic circulation and planetary wave theory. Investigations will concern the use of altimetry and satellite imagery to monitor waves, assimilation of altimeter data into numerical models, and other topics of importance to established national programs in ocean and climate studies. The position requires a demonstrated ability to do scientific research as evidenced by publications in the literature. A Ph.D. in physical sciences or equivalent is required. Applications in applying for this position should include a copy of the vacuum chamber which includes a qualification requirements by writing to Ms. Louise Turner, RAS/DC32, NOAA, National Ocean Service, Rockville, Maryland 20852, or by calling 301-443-8995. Applications should be submitted to Standard Form 171. Closing date for applications is 12-10-84.

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Assistant Professor—Isotope Geochemistry/The University of Minnesota. The Department of Geology and Geophysics at the University of Minnesota, Minneapolis, invites applications for a 3 to 5 year tenure track assistant professor. Preference is given to isotope geochemistry. Beginning Fall 1985. We are seeking someone with a Ph.D. and preferably some postdoctoral experience, an individual who will be active in research and teaching in addition to the operation of an existing solid-source mass-spectrometer laboratory. The geochemistry program at Minnesota emphasizes the use of the mass-spectrometer, with the in-house programs in ionics and neutron capture petrology, tectonics, hydrogeology and limnology. The breadth of this position is expected to continue this tradition in addition to comparing with or complementing the existing geochemistry research program in aqueous geochemistry, stable isotope geochemistry, and noble gas geochemistry, particularly in the field of hydrothermal interaction, and marine evolution.

Please submit a letter of application and attach a curriculum vitae, a statement of research and teaching interests, a list of publications and the names of three to five references. Address your correspondence by February 15, 1985, to Dr. Robert O. Reid, Department of Geology and Geophysics, University of Minnesota, 2215 Folger Drive, S.E., Minneapolis, MN 55455.

The University of Minnesota is an equal opportunity educator and employer and specifically invites courses in geophysics or depositional systems and sedimentology, his/her specialty, and tectonics. The person will be expected to initiate a research program and to attend M.S. and Ph.D. graduate students. Send a letter of application with complete curriculum vitae and names of three references to Dr. Robert O. Reid, Chair, Department of Geology and Geophysics, Texas A&M University, College Station, Texas 77843.

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Texas Tech University/Geophysicist or Geologist. The Department of Geosciences at Texas Tech University seeks applications for a tenure track position in the fields of geophysics or elastic sedimentology to begin August 1985. Rank and salary will be commensurate with qualifications. The Ph.D. is required. Entry-level applicants would be considered. Applications should be submitted to the Chair, Department of Geosciences, Texas Tech University, P.O. Box 4109, Lubbock, TX 79409.

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Computer Manager/Minicomputer Specialist. Memphis State University seeks a candidate to manage a PDP 11/44 and a major facility expansion to include a superminicomputer system (VAX 11/785 class) to be dedicated to research applications in the Geological Sciences and Geophysics. Hardware and software are designed for digital seismic data acquisition, digital seismic data processing and graphical representation of geological and geophysical data.

The candidate must have at least a BS degree in Computer Science, Electrical Engineering or related field; three years programming experience including FORTRAN and ASSEMBLY; knowledge of various computer hardware and software; ability to perform numerical calculations; knowledge of PASCAL and C languages and RMX/11 operating system will help.

Salary is negotiable depending on experience. Applications should submit a resume, copies of academic transcripts, and the names, addresses, and telephone numbers of three persons whom may serve as references, and letter of interest by December 31, 1984, to Robert O. Reid, Distinguished Professor and Head, Department of Oceanography, Texas A&M University, College Station, Texas 77843.

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